

Amendment and Response

Applicant: Christian Birzer et al.

Serial No.: 10/588,401

Filed: May 11, 2007

Docket No.: I431.167.101/FIN575PCT/US

Title: SEMICONDUCTOR DEVICE HAVING A CHIP STACK ON A REWIRING PLATE

IN THE CLAIMS

Please add claims 33-36.

Please amend claims 11, 19, and 26 as follows:

1-10. (Cancelled)

11. (Currently Amended) A semiconductor device comprising:

 a semiconductor chip stack on a rewiring plate, the underside of the rewiring plate forming the underside of the semiconductor device;

 an external contact area having a plurality of individual external contact area regions which are physically separate from one another being arranged on the underside;

each of the individual external contact area regions being assigned to a different one of the individual semiconductor chips in the semiconductor chip stack; and

 the regions of an individual external contact regions of the external contact area being electrically connected via a common external contact.

12. (Previously Presented) The semiconductor device of claim 11, wherein the rewiring plate comprises, on its top side, a rewiring structure which comprises, in the center of the rewiring plate, contact pads for connecting a semiconductor chip to flip-chip contacts and comprises, in the edge region, contact pads for bonding connections to a stacked semiconductor chip.

13. (Previously Presented) The semiconductor device of claim 11, wherein the rewiring plate comprises, in the center of its top side, a rewiring structure for fitting the rear side of a lower semiconductor chip and comprises, in the edge regions, contact pads for bonding connections to top sides of the stacked semiconductor chips.

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14. (Previously Presented) The semiconductor device of claim 11, wherein the rewiring plate comprises through-contacts via which the contact pads on the top side of the rewiring plate are connected to the external contact area regions on the underside of the rewiring plate.

15. (Previously Presented) The semiconductor device of claim 11, wherein the rewiring plate comprises rewiring lines which connect the external contact area regions to the contact pads.

16. (Previously Presented) The semiconductor device of claim 11, wherein the semiconductor chips of the semiconductor device comprise, on their active top sides, contact areas which are connected, via flip-chip contacts and/or bonding connections, to the contact pads on the top side of the rewiring plate.

17. (Previously Presented) The semiconductor device of claim 11, wherein the semiconductor chip stack on the rewiring plate is embedded in a plastic composition.

18. (Previously Presented) A panel which comprises device positions which are arranged in rows and columns and have semiconductor devices of claim 11.

19. (Currently Amended) A semiconductor device comprising:

 a semiconductor chip stack on a rewiring plate, the underside of the rewiring plate forming the underside of the semiconductor device;

 an external contact area having a plurality of individual external contact area regions which are physically separate from one another being arranged on the underside;

 each of the individual external contact area regions being assigned to a different one of the individual semiconductor chips in the semiconductor chip stack; and

 the ~~regions of an~~ individual external contact regions of the external contact area being electrically connected via a common external contact;

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wherein the rewiring plate comprises, on its top side, a rewiring structure which comprises, in the center of the rewiring plate, contact pads for connecting a semiconductor chip to flip-chip contacts and comprises, in the edge region, contact pads for bonding connections to a stacked semiconductor chip, and wherein the rewiring plate comprises through-contacts via which the contact pads on the top side of the rewiring plate are connected to the external contact area regions on the underside of the rewiring plate.

20. (Previously Presented) The semiconductor device of claim 19, wherein the rewiring plate comprises rewiring lines which connect the external contact area regions to the contact pads.

21. (Previously Presented) The semiconductor device of claim 20, wherein the semiconductor chips of the semiconductor device comprise, on their active top sides, contact areas which are connected, via flip-chip contacts and/or bonding connections, to the contact pads on the top side of the rewiring plate.

22. (Previously Presented) The semiconductor device of claim 21, wherein the semiconductor chip stack on the rewiring plate is embedded in a plastic composition.

23. (Previously Presented) The semiconductor device of claim 22, wherein the rewiring plate comprises, on its top side, a rewiring structure which comprises, in the center of the rewiring plate, contact pads for connecting a semiconductor chip to flip-chip contacts and comprises, in the edge region, contact pads for bonding connections to a stacked semiconductor chip.

24. (Withdrawn) A method for producing and testing a panel having semiconductor device positions which are arranged in rows and columns and have semiconductor chip stacks, the method comprising:

producing a circuit carrier in the form of a rewiring plate having rewiring lines which electrically connect, via through-contacts, contact pads on the top side of the circuit carrier to

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external contact area regions on the underside of the circuit carrier, the external contact area regions being patterned in such a manner that a plurality of external contact area regions are provided for the purpose of fitting an external contact;

applying a stack of semiconductor chips to the circuit carrier with connection of contact areas of the semiconductor chips to contact pads on the top side of the circuit carrier;

covering the circuit carrier with a plastic composition in the region of the semiconductor device positions;

testing each individual semiconductor chip in a semiconductor chip stack using the corresponding external contact area regions on the underside of the circuit carrier; and

marking defective semiconductor devices.

25. (Withdrawn) The method of claim 24, comprising:

applying external contacts to the external contact area regions with electrical connection of the external contact area regions; and

separating the panel into individual semiconductor devices.

26. (Currently Amended) A semiconductor device comprising:

a semiconductor chip stack on a rewiring plate, the underside of the rewiring plate forming the underside of the semiconductor device;

means for providing an external contact area having a plurality of individual external contact area regions which are physically separate from one another being arranged on the underside;

each of the individual external contact area regions being assigned to a different one of the individual semiconductor chips in the semiconductor chip stack; and

the regions of an individual external contact regions of the external contact area being electrically connected via a common external contact.

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27. (Previously Presented) The semiconductor device of claim 26, wherein the rewiring plate comprises, on its top side, a rewiring structure which comprises, in the center of the rewiring plate, contact pads for connecting a semiconductor chip to flip-chip contacts and comprises, in the edge region, contact pads for bonding connections to a stacked semiconductor chip.

28. (Previously Presented) The semiconductor device of claim 26, wherein the rewiring plate comprises, in the center of its top side, a rewiring structure for fitting the rear side of a lower semiconductor chip and comprises, in the edge regions, contact pads for bonding connections to top sides of the stacked semiconductor chips.

29. (Previously Presented) The semiconductor device of claim 26, wherein the rewiring plate comprises through-contacts via which the contact pads on the top side of the rewiring plate are connected to the external contact area regions on the underside of the rewiring plate.

30. (Previously Presented) The semiconductor device of claim 26, wherein the rewiring plate comprises rewiring lines which connect the external contact area regions to the contact pads.

31. (Previously Presented) The semiconductor device of claim 26, wherein the semiconductor chips of the semiconductor device comprise, on their active top sides, contact areas which are connected, via flip-chip contacts and/or bonding connections, to the contact pads on the top side of the rewiring plate.

32. (Previously Presented) The semiconductor device of claim 26, wherein the semiconductor chip stack on the rewiring plate is embedded in a plastic composition.

33. (New) A semiconductor device comprising:

 a rewiring plate having a top side and an underside, the underside of the rewiring plate forming an underside of the semiconductor device;

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a plurality of semiconductor chips stacked on the top side of a rewiring plate, the semiconductor chips stacked in an off-set fashion so as to expose at least a portion of a top side of each of the semiconductor chips, the exposed portion of the top side of each semiconductor chip including at least one contact area;

an external contact area on the underside of the rewiring plate, the external contact area having a plurality of individual external contact area regions which are physically separate from one another, each of the individual external contact area regions being assigned to one of the semiconductor chips of the plurality of semiconductor chips; and

a common external contact which electrically connects each of the individual external contact regions of the external contact area to one another.

34. (New) The semiconductor device of claim 33, wherein the common external contact comprises a solder bump.

35. (New) The semiconductor device of claim 33, wherein each of the individual external contact area regions is coupled to the at least one contact area on the exposed portion of the top surface of the corresponding semiconductor chip using a bonding wire.

36. (New) The semiconductor device of claim 35, wherein each of the bonding wires is coupled to a corresponding contact area on the top side of the rewiring plate, and wherein the corresponding contact area is coupled to the corresponding individual external contact area region by a via extending through the rewiring plate and a rewiring structure disposed on the underside of the rewiring plate.